

OCCUPATIONAL ILLNESSES AND INJURIES
DUE TO EXPOSURE TO METHOMYL
IN CALIFORNIA IN 1979

By

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SUMMARY

There were 25 cases of occupational exposure to methomyl reported by California physicians in 1979. Of the 25 reported cases, 21 were systemic illnesses, 3 were eye injuries, and 1 was a skin injury. Eleven cases involved mixer/loaders for aerial application. Five cases involved ground applicators. Lannate was implicated in 16 of the 25 cases. Of these 16 cases, 12 reported use of the soluble powder formulation, 2 reported use of the liquid formulation, and 2 did not report the formulation used. Nudrin was implicated in 9 cases. Nudrin 90, the powder, was involved in 5 cases; Nudrin 1.8, the liquid, was involved in 3 cases; and an undetermined formulation was involved in 1 case. The most common route of exposure was inhalation of either the fumes or the dust. Many incidents resulted from employee negligence. More than 50 percent of the employees either did not wear all the required safety equipment or did not report if safety equipment was used. There was an increase in the amount of methomyl applied in California in 1979 in comparison with 1978. Although the number of reported occupational illnesses due to methomyl exposure decreased for 1979, the total days of disability and hospitalization increased.

CASE STUDIES

Mixer/Loader (for aerial application) - 11 cases

Systemic Illnesses

A mixer/loader was mixing Nudrin 90, Super Sulfur, and Difolatan. Clumps began to form, so he proceeded to break them up by hand. He reportedly wore all safety equipment, including rubber gloves, during the operation. He later complained of malaise, nausea, miosis, and vomiting. He was taken to a hospital emergency room for atropine treatment. He lost 3 days of work.

A mixer was mixing Nudrin 90 to be applied to oranges. One of the water-soluble bags had a hole in it, and some Nudrin escaped into the air and was inhaled by the mixer. He became shaky and was nauseated. It was not known if safety equipment was used. He lost 1 day of work.

A mixer was loading Nudrin 1.8 and Dipel for a helicopter application and while waiting for the helicopter to return, he felt spray drift from the application. He developed symptoms of dizziness and nausea. The cause of the illness could not be substantiated by the investigator. The mixer reported wearing coveralls, rubber gloves, and a respirator. A closed system was reportedly not used. The physician on the case estimated a disability period of 6 weeks.

A mixer was opening foil wrapped water-soluble bags of Nudrin 90 when the inner plastic bag tore open. The wind blew concentrated powder onto the mixer's face and respirator, which was not properly fitted. Within 20 minutes, he complained of nausea, vomiting, diarrhea, excessive salivation, watering eyes, blurred vision, and general malaise. He was taken to the hospital where he received atropine treatment. All required safety equipment had been provided and was in use at the time the exposure occurred. He remained in the hospital for 1 day and lost 5 days of work.

A mixer became exposed to Lannate SP during a mixing and loading operation. He split the bags open for each load. He did not wear a respirator and apparently inhaled some Lannate powder. He developed symptoms of dizziness, pinpoint pupils, and salivation. He was taken to the hospital, admitted, and released 3 days later. He missed 11 days of work.

While a mixer was working with Lannate and Monitor, he experienced acute pesticide intoxication. He stated he wore all protective clothing and used a closed system. He could not explain his exposure. He lost 2 weeks of work.

A mixer/loader attempted to disconnect the dry coupler valve after loading a helicopter with Lannate, Metasystox, and Thiodan. In doing so, he flipped the valve thinking he was closing it while, in fact, he was opening it; the pilot had already closed it. The result was that as it was removed, he was sprayed with the material. His blood cholinesterase level was depressed. His disability status was not reported.

A mixer/loader spilled some mixed Lannate on his skin. He immediately washed; however, during the day he perspired heavily and later felt ill. He reportedly wore all the required protective clothing. His blood cholinesterase results were within the normal range. Disability status was not reported.

A worker stated that he unloaded cartons of Lannate from a trailer at the mix site and opened each carton. Each carton contained two water-soluble bags. When he opened the cartons, he could see powder on some of the bags, and could smell the Lannate. He did not see any broken bags. He stated that while he opened the cartons of Lannate, he wore coveralls, a respirator, rubber gloves, rubber boots, and goggles. Within 15 minutes he began to feel ill with stomach cramps, nausea, and blurred vision. Later in the evening he went to the hospital for treatment. It was not known if any time was lost from work.

A mixer/loader opened a box of Lannate SP, and some of the water-soluble bags were broken. He dropped the box, and some of the Lannate powder billowed into his face. He was not wearing goggles or a respirator. He washed off and reported the incident to the pilot. He was told to inform the supervisor if he began to feel ill. During the day he complained of nausea, headaches, and eye twitches. He was sent to the hospital for treatment. He did not miss any work time.

An employee was helping in a mixing and loading operation of Lannate for an aerial application. The Lannate was in water-soluble bags, some of which were broken open. The airplane's slipstream blew the Lannate powder into his face. He reportedly wore only gloves for protection and neglected all the other required safety equipment. Within 2 hours he experienced weakness, twitching, excessive salivation, and tremors of his extremities. He was hospitalized for 5 days and lost 8 days of work.

Mixer/Loader (ground application) - 2 Cases

Systemic Illness

While loading a tractor with a Lannate mix, the hose burst and sprayed directly into the mixer/loader's face. He washed his face and eyes but began to feel ill. He reported that he had taken off his goggles just prior to loading. He drove to a friend's house and was taken to the hospital. He was not provided with sufficient supervision during a night application. He did not lose any time from work.

Eye Injury

A mixer was training a new employee. He told the new employee to mix Lannate SP and Phosdrin in the mix tank. The mixer walked away as the new employee opened the water-soluble bags of Lannate. As another vehicle drove up, the wind caused the material to blow into the mixer's eye. He was not wearing his safety equipment. He lost no time from work.

Mixer/Loader (unknown application) - 1 Case

Eye Injury

While unloading bags of Lannate, a worker got some of the powder in his eye, and developed conjunctivitis. He was treated by a physician and released. It was not known if any safety equipment was used. He lost no time from work.

Ground Applicator - 5 Cases

Systemic Illnesses

An employee helped mix, load, and apply Lannate SP on tomatoes. On the second day, he began to feel dizzy. He reportedly wore all the required safety equipment and used a closed mixing system. His blood cholinesterase level was within normal limits. His disability status was unknown.

An applicator was spraying Lannate SP on nectarines. He became dizzy and his vision was blurred. He vomited several times. He stated he wore all protective gear. His training records were complete. It was not known if any time from work was lost.

An applicator was spraying cherry tomatoes with Nudrin 1.8, using a hand sprayer. The spray wand ruptured, causing the material to be sprayed on his face and body. He developed a headache and intermittent abdominal cramps, and began to vomit. He did not wear protective equipment. His disability status was unknown.

An employee was applying liquid Lannate. Later in the evening, he began to vomit. He was taken to a hospital for treatment. The details of the incident were not reported. It was not known if safety equipment was used or if any time was lost from work.

An applicator was applying Nudrin 90 on grapes. He became dizzy and had abdominal cramps. He reportedly wore coveralls and gloves. He stated that he did not spill or rupture any bags of material; however, he did receive small amounts of drift on himself. He felt fine the next day and lost no time from work.

Self-Employed - 2 Cases

Systemic Illnesses

An owner/applicator had been spraying Lannate SP and Omite on grapes for 3 or 4 days. He developed symptoms of abdominal pain, dizziness, vomiting, and slightly constricted pupils. He stated that when he opened the lid to check the level of pesticide in the tank, he received a full dose of fumes. He wore no protective equipment. He was admitted into the hospital for treatment. He required 2 days of hospitalization and he lost 3 days of work.

An owner was working on a spray rig that had been used to apply Lannate SP to cotton. He pumped the material into another tank in order to repair the spray rig. He wore no safety equipment while he repaired the rig. He developed symptoms of nausea, trembling, headache, and excessive perspiration. His disability status is unknown.

Warehouse Worker - 1 Case

Systemic Illness

A worker was dumping Nudrin containers and got some material under his protective clothing. He developed nausea, blurred vision, shakiness, difficulty in breathing, pinpoint pupils, and dry mouth and skin. He received atropine treatment. It was not known if time was lost from work.

Flagger - 1 Case

Skin Injury

A flagger stated he apparently got Nudrin 1.8 on his leg while working. He said that he was sitting on a ditch bank waiting for an airplane to return when his leg began to itch. He was treated for a chemical burn on his leg. He did not miss any time from work.

Other Type Exposure - 2 cases

Systemic Illnesses

A worker drank from a well that had accidentally siphoned back some Lannate mix from an earlier filling. He developed abdominal cramps within 5 minutes. He began to vomit and perspire heavily, and his pupils were constricted. He was taken to the hospital for treatment. It was not known if any time from work was lost.

While loading empty rinsed containers of Nudrin 90 into a pickup truck, an employee got some material in his eye. He developed mild conjunctivitis and was sent to a physician as a precaution. No time from work was lost.

DISCUSSION

There was a decrease in the number of reported cases of occupational illness due to methomyl exposure in 1979 in comparison with 1978; from 38 reported cases in 1978 to 25 reported cases in 1979. The amount applied increased from 955,028 pounds in 1978 to 1,223,496 pounds in 1979 according to the Department's Annual Pesticide Use Report. Of the reported methomyl-related illnesses, the percentage of systemic illnesses was about equal for both years. Approximately 85 percent of the total number of reported illnesses due to methomyl exposure were reported as systemic illnesses for both years. A total of 88 days of disability and 11 days of hospitalization were reported in 1979. One case reported 42 days of disability. In 1978, a total of 56 days of disability and 7 days of hospitalization were reported.

Many of these cases may have been avoided if safety procedures had been followed. More than 50 percent of the reported cases either did not use or did not report using any safety equipment. The extremely high percentage of systemic illnesses is representative of the adverse effect methomyl has following exposure.

Methomyl is available under two trade names. One name is Lannate and the other is Nudrin. Lannate was reportedly involved in 16 of the 25 cases, while Nudrin was reportedly involved in the remaining 9 cases. The soluble powder formulation of Lannate was used in 12 cases, and the liquid formulation was used in 2 cases. Two cases did not report the formulation used. The soluble powder formulation of Nudrin was used in 5 cases, and the liquid formulation was used in 3 cases. One case involved an unknown formulation of Nudrin. Methomyl is an N-methyl carbamate which, in turn, is a cholinesterase inhibitor. Absorption through the intact skin appears to be of minimal importance. Poisoning results from the accumulation of excessive amounts of acetylcholine in affected organs. Exposure of mammals to methomyl can produce profound depression of serum cholinesterase, but this is usually reversed within 4 hours. Atropine sulfate has proven to be a very effective treatment for carbamate poisoning. The use of water-soluble packaging decreases inhalation exposure provided the package remains intact before mixing. Sometimes, however, there are broken packages or loose powder in the intact cartons of Lannate and Nudrin. Some mixer/loaders split open water-soluble bags before putting them in the mix tank. Therefore, safety equipment, including a respirator and goggles, is required as an additional precautionary measure.

TABLE I

Occupational Illnesses and Injuries Due to Exposure to Methomyl
as Reported by Disability Status in 1979

<u>Days of Disability</u>	<u>Reported Cases</u>
0	7
1-3	3
4-7	1
8-14	3
15-42	1
unknown	10
TOTAL	<u>25</u>

Total days of
disability is 88 days.

<u>Days of Hospitalization</u>	<u>Reported Cases</u>
0	21
1-2	2
3-5	2
TOTAL	<u>25</u>

Total days of
hospitalization is
11 days.

TABLE II

Occupational Illnesses and Injuries Due to Exposure to Methomyl
as Reported by Product Name and Formulation, and Job Activity in 1979

<u>Job Activity</u>	<u>Formulation</u>				
	<u>Lannate SP</u>	<u>Lannate L</u>	<u>Nudrin 90</u>	<u>Nudrin 1.8</u>	<u>Unknown</u>
Mixer/Loader (aerial application)	5	0	3	1	2
Mixer/Loader (ground application)	1	0	0	0	1
Mixer/Loader (unknown application)	1	0	0	0	0
Ground Applicator	2	1	1	1	0
Self-Employed Farmer	2	0	0	0	0
Warehouse Worker	0	0	0	0	1
Flagger	0	0	0	1	0
Other Type Exposure	0	0	1	0	1
	<u>11</u>	<u>1</u>	<u>5</u>	<u>3</u>	<u>5</u>

TABLE III

Occupational Illnesses and Injuries Due to the Exposure to Methomyl
as Reported by County of Occurrence in 1979

Fresno	10	Monterey	1
Glenn	1	San Benito	1
Imperial	2	San Joaquin	2
Kern	2	Tulare	2
Madera	1	Yolo	1
Merced	2		